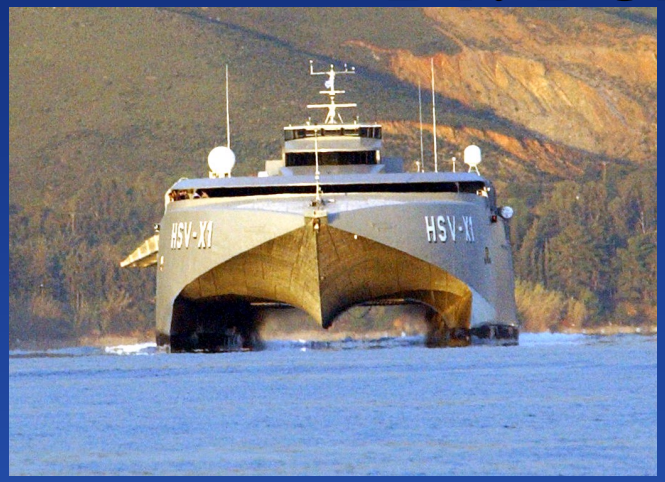
RAPID PORT ENHANCEMENT: Port Assessment

Dr. Don Resio



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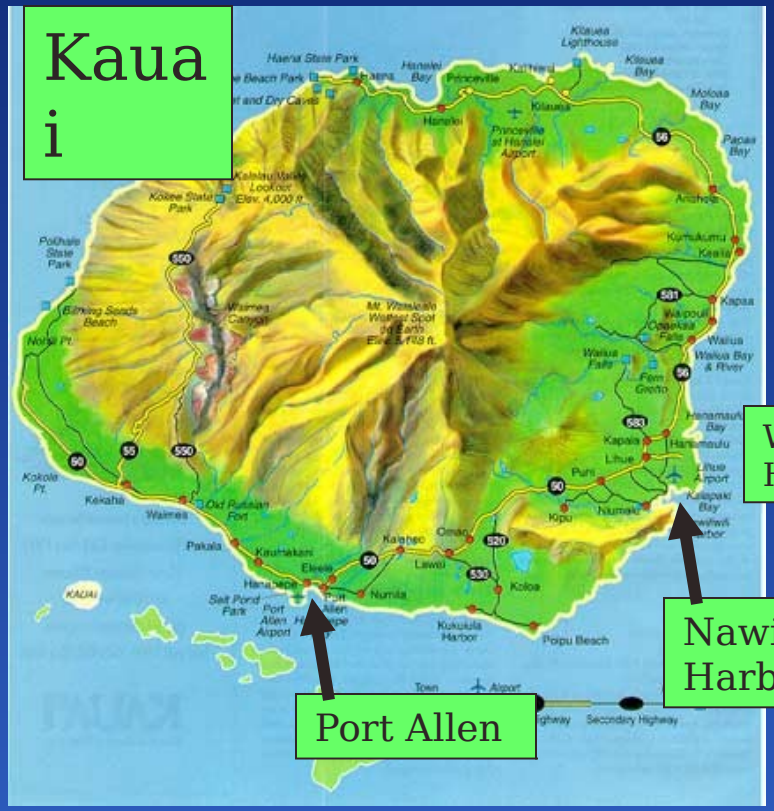
Outline

- ***Data/Tools for TSV/HSC Planning***
- ***Conventional Ports***
- ***Alternative Offload Sites***
  - ***Rivers***
  - ***“Open” Coasts***

Small Port Assessments in Kauai and Oahu



TSV-compatible as is.

Infrastructure damage limits weight below 25 tons. Some upgrade/modifications required.

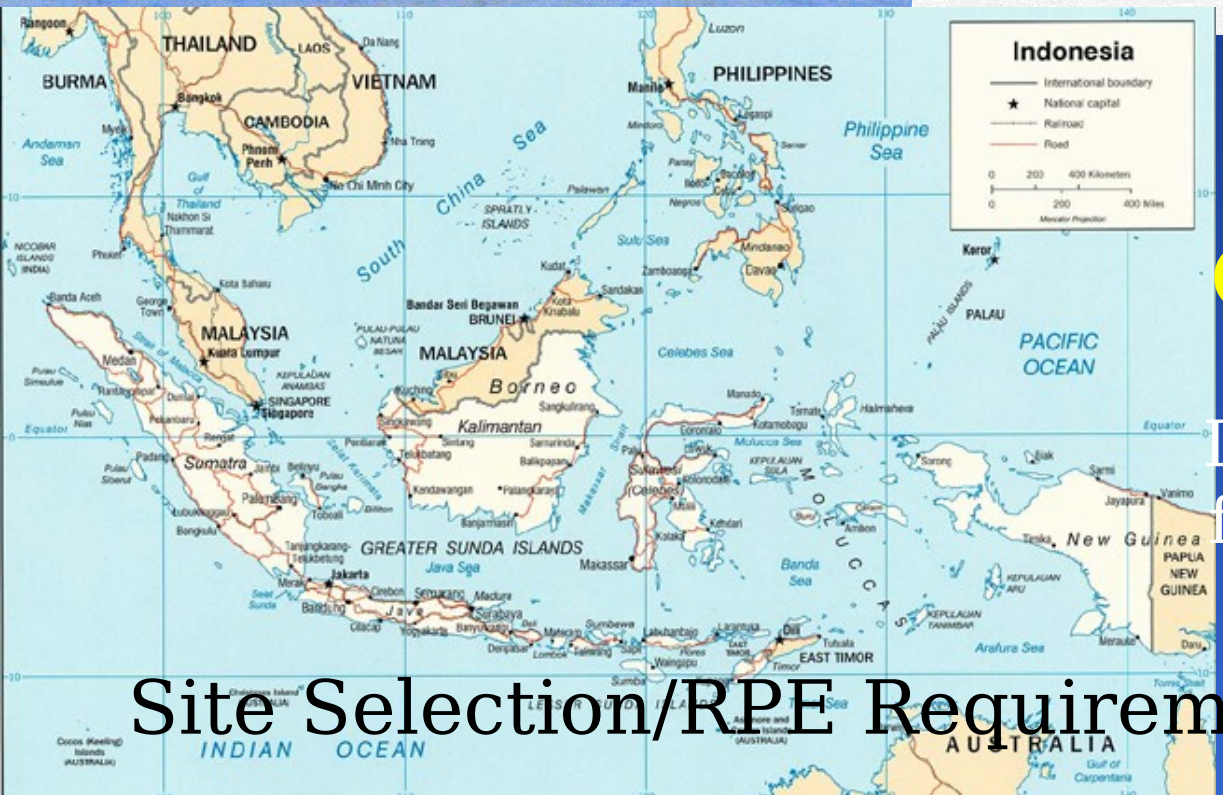
Draft limitations in 70 % of protected area. Some upgrade/modifications required – short causeway extension

Draft limitations in all of protected area. Some upgrade/modifications required – Long causeway &

Ship Design Parameters

Prediction of Force Closure Times

Clousure Time in Days: *Stryker Brigade*			
	Case 1	**Case 2**	**Case 3**
Existing	4.7	5.2	10.3
Enhanced	3.3	3.6	6.2



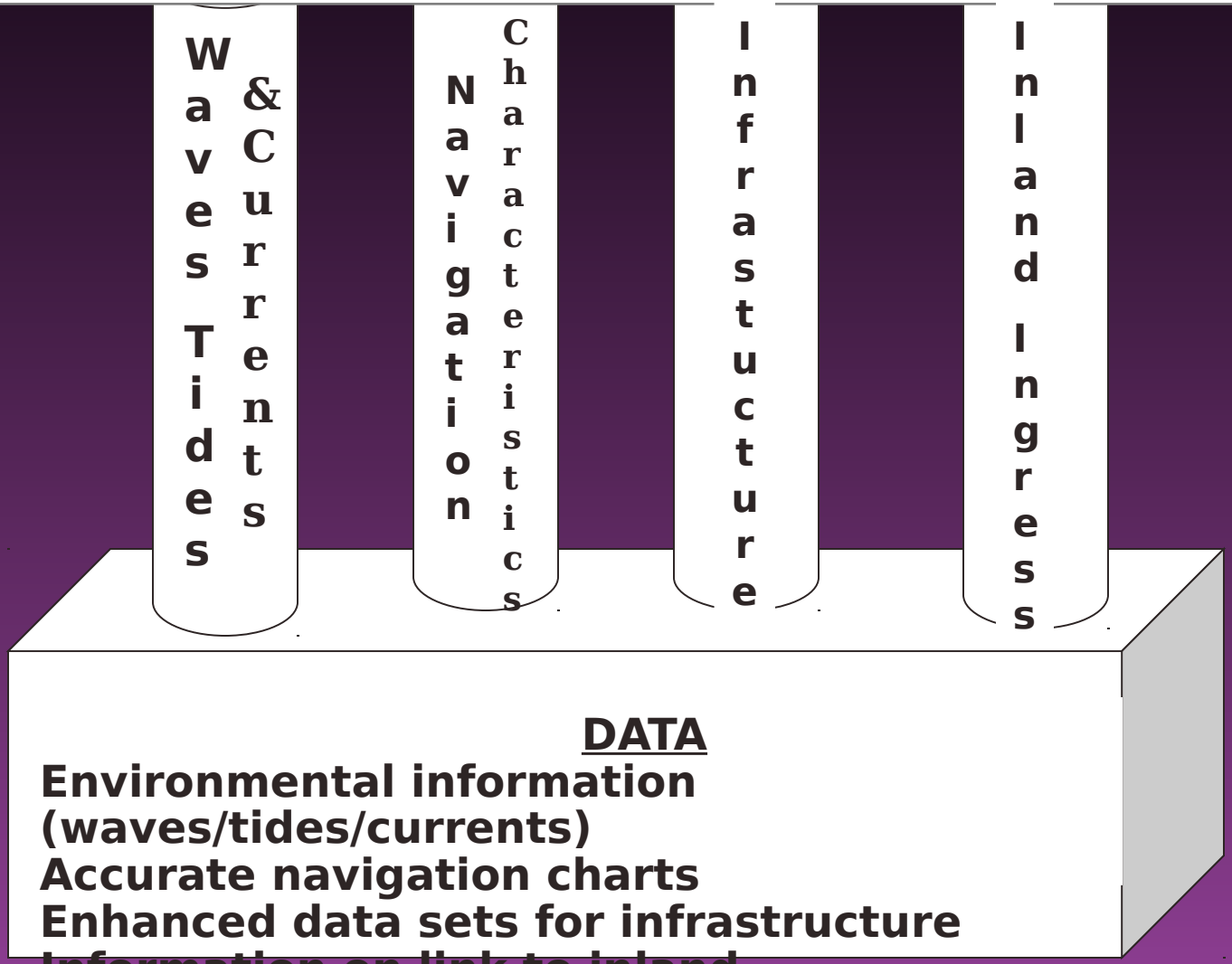
Site Selection/RPE Requirements

Port Characterization

Information is needed for many applications

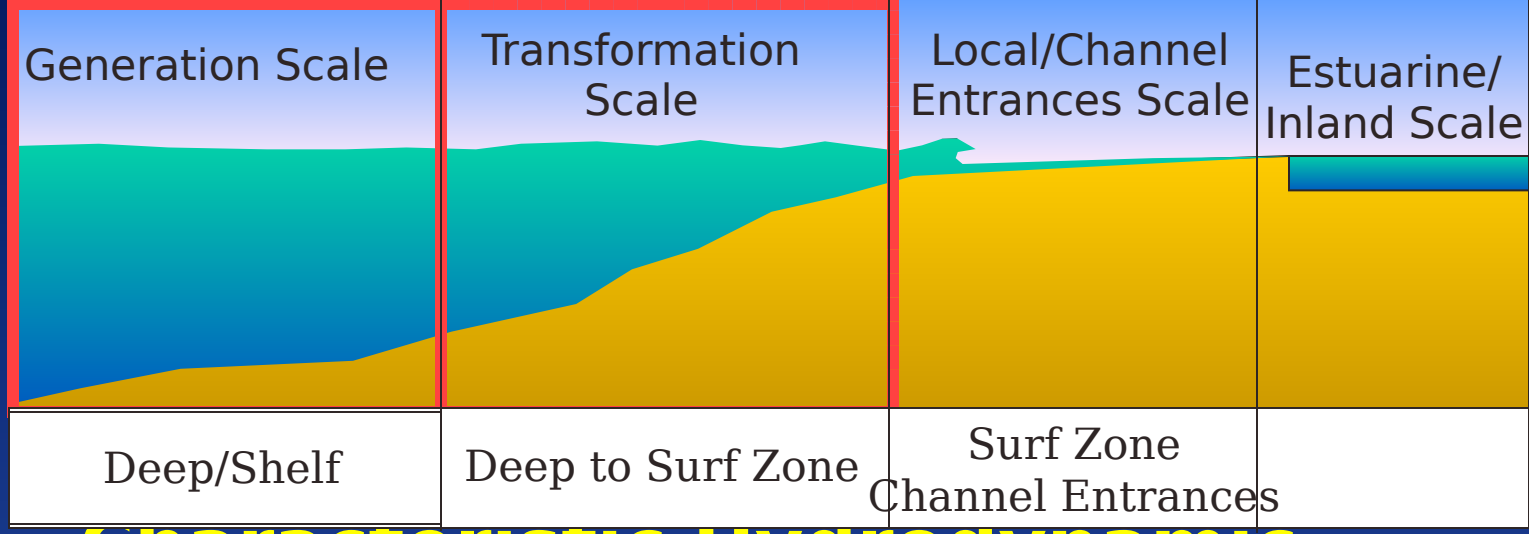
TOOLS

RPE tool-kit:Quantifies options/impacts of RPE
Simulation tools:quantify throughput processes



DATA

Environmental information (waves/tides/currents)
Accurate navigation charts
Enhanced data sets for infrastructure
Information on link to inland



Characteristic Hydrodynamic Zones

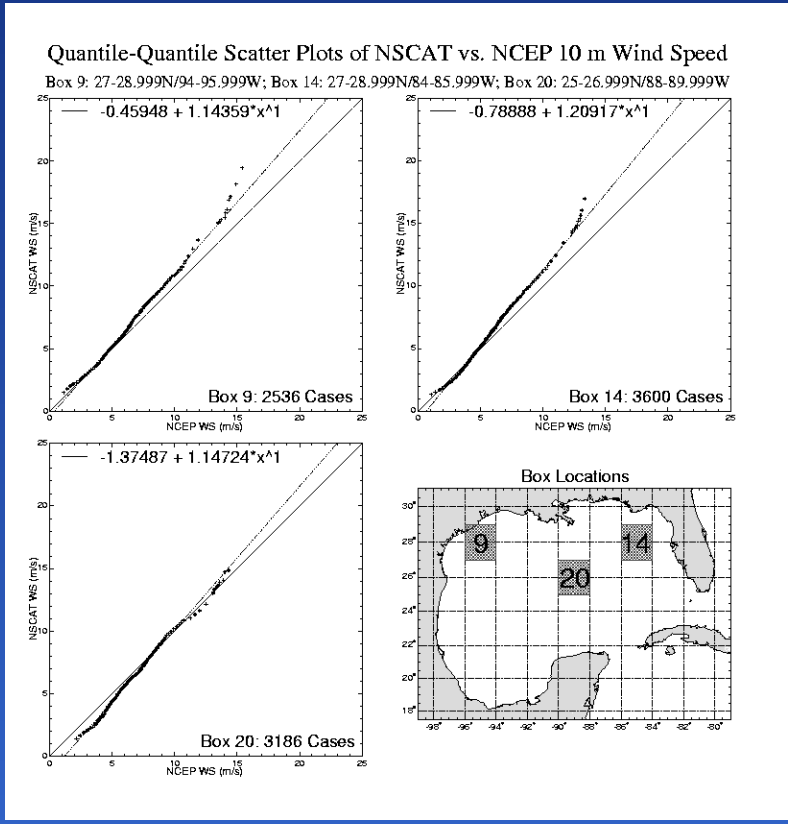
Waves/Tides in Coastal Areas

Donald T. Resio

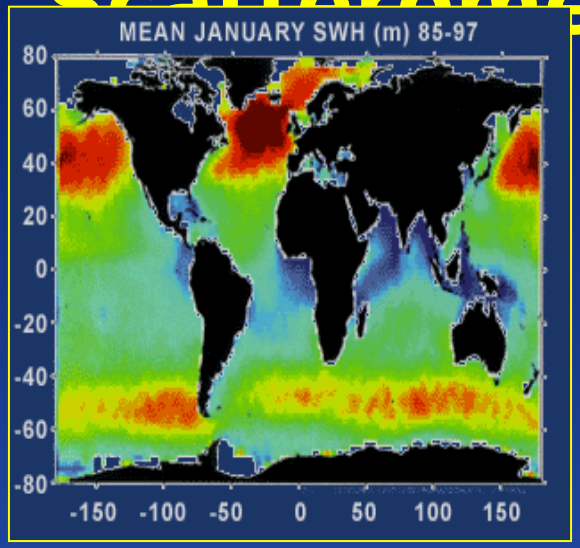
Accurate Global Wave/Tide Estimates for Coastal Operations

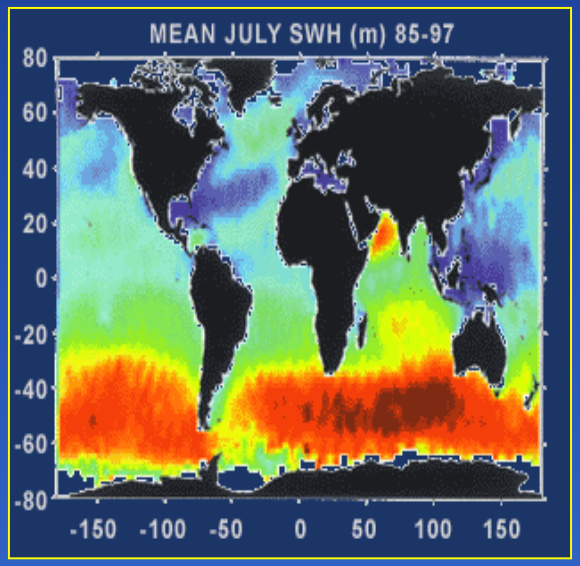
Global Wind Estimates for Coastal Areas

- ***NCEP plus statistical assimilation methodology***
- ***In-house, global database for all satellite wave measurements***
- ***Developed 40-year baseline climatology of wind fields***
- ***Ocean-scale tidal components can be calibrated via satellite***



Satellite Altimetry (A) and Scatterometry (S)





Geosat 1985 - 1989

Surface wind (A), Significant wave height, Sea Leve

ERS-1 1991 - 1996

Surface wind (A,S), Significant wave height, Sea Le

ERS-2 1995 - present

Surface wind (A,S), Significant wave height

TOPEX 1992 - present

Surface wind (A,S), Significant wave height, Sea Le

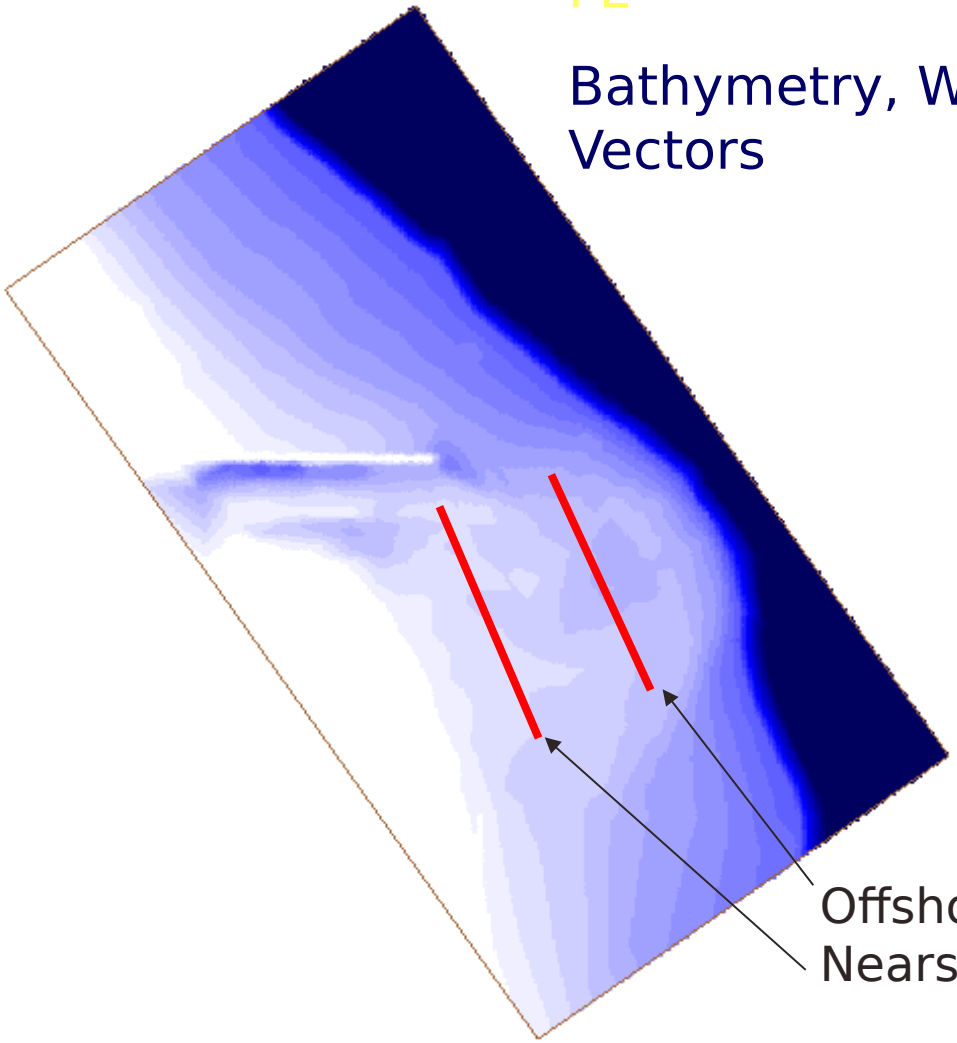
QuikSCAT 1999-present

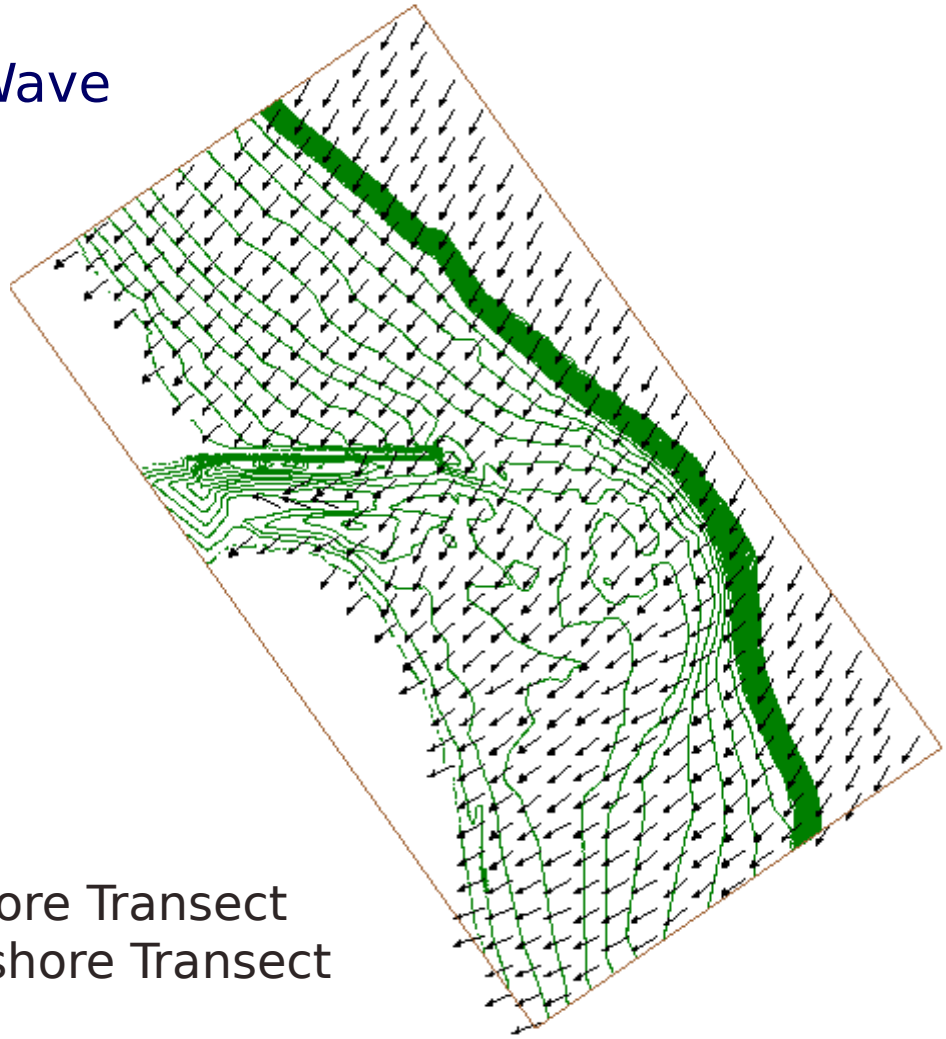
Surface wind (scatterometer mode only)

Waves in Entrance Channels

Ponce de Leon Inlet , FL

Bathymetry, Wave Vectors

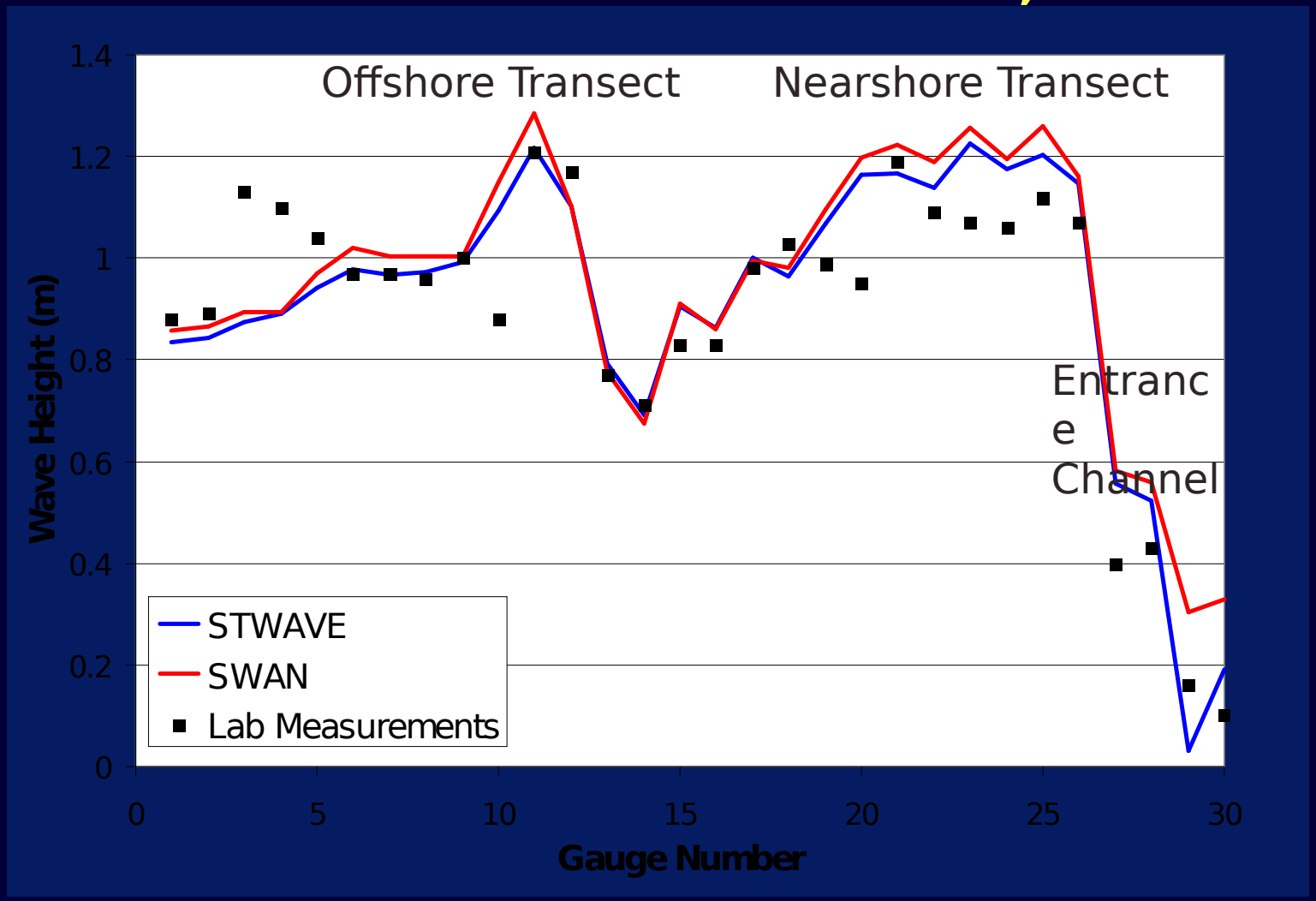




Offshore Transect
Nearshore Transect

Waves in Entrance Channels

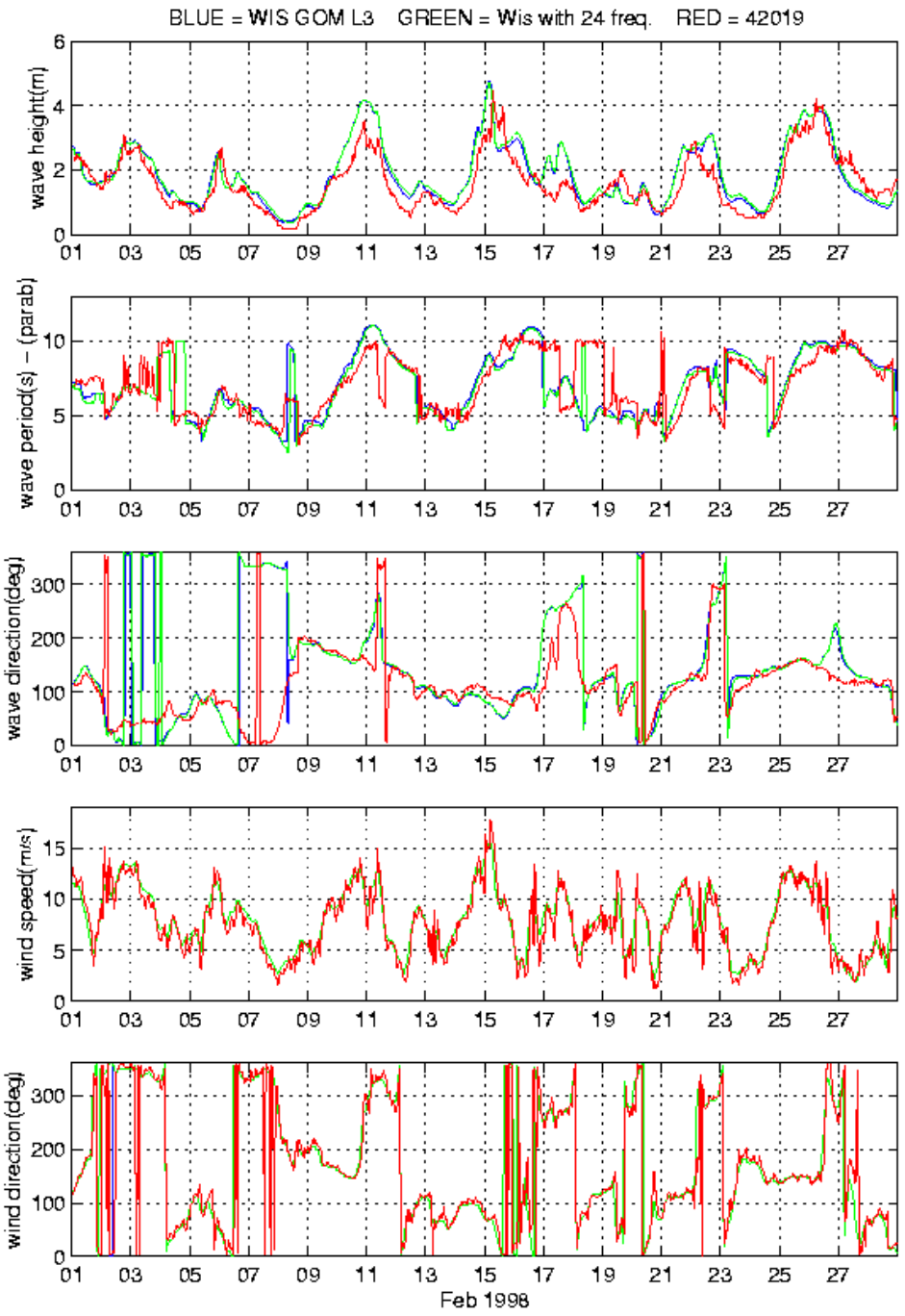
Ponce de Leon Inlet ,



Typical comparison to measurements using global estimation methodology

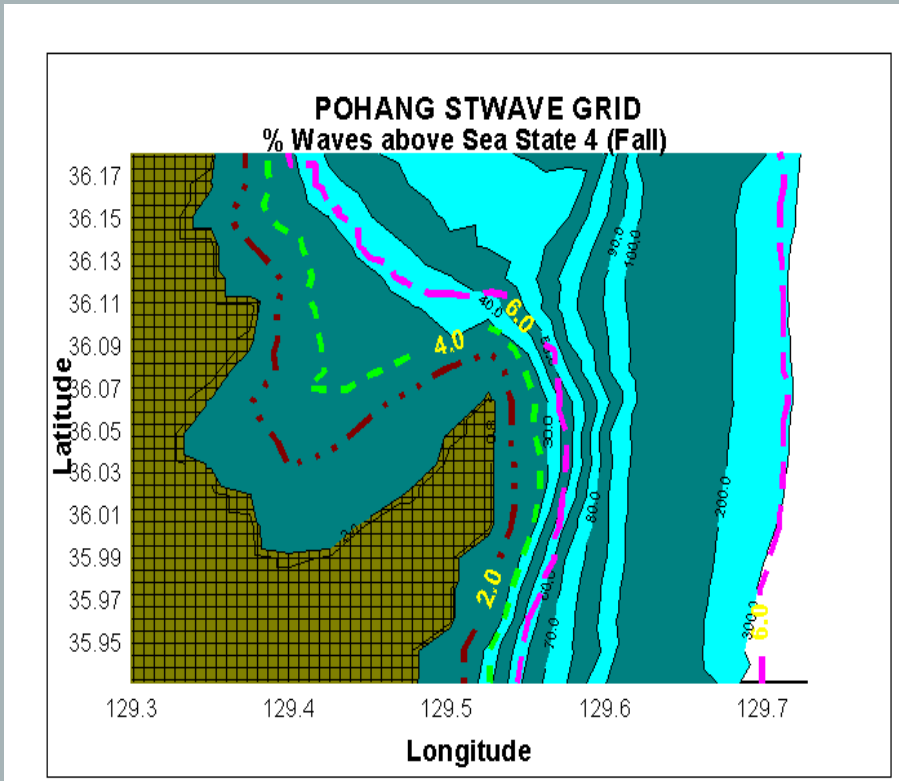
Accuracy is sufficient f
Good estimates of H, T

Adequate information
local wind, water level,
and wave climates
including “local” valida
via satellite


BLUE = WIS GOM L3 GREEN = Wis with 24 freq. RED = 42019
wave height(m)
wave period(s) – (parab)
wave direction(deg)
wind speed(m/s)
wind direction(deg)
01 03 05 07 09 11 13 15 17 19 21 23 25 27
Feb 1998

Rapid Generation Littoral Environments RAGLES

- *Results*
  - *RAGLES is capable of generating detailed wind, wave, and water level information*
    - *Many assumptions concerning sheltering are significantly incorrect*
  - *RAGLES incorporates numerical, model, satellite, and in situ data*
    - *Improved algorithm for satellite wave estimates*

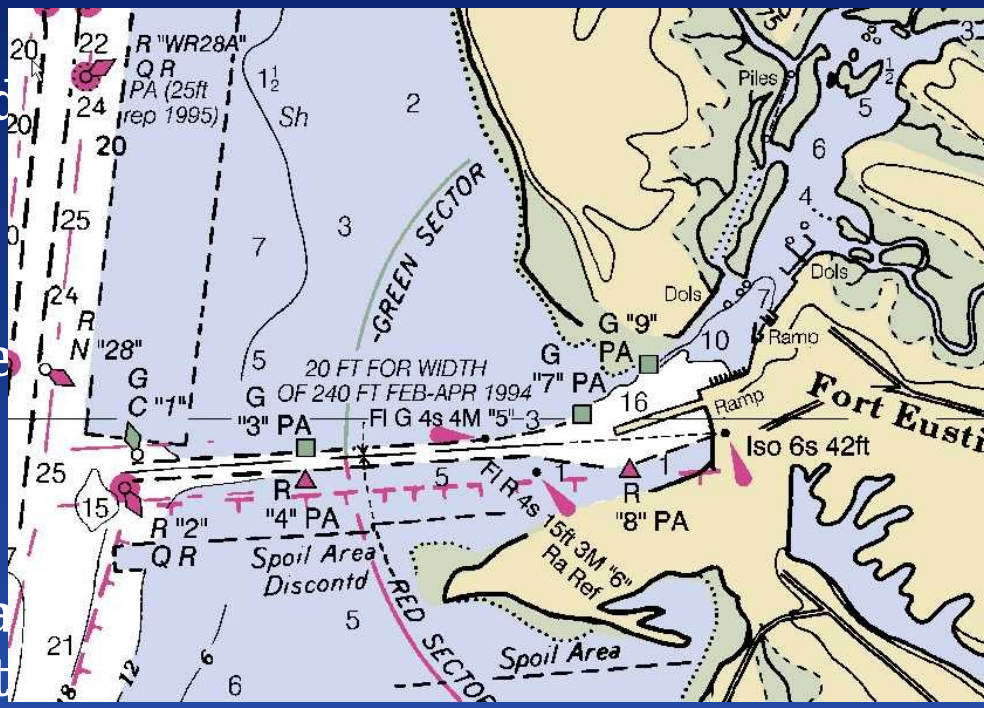


Navigation/Topographic Chart D

Data on charts is not static and out-of-date

Important factors include:

- **limiting depth of channe**
- **length of channel**
- **channel characteristics**
- **size of turning basin**
- **size of cargo discharge a**
- **depth at discharge point**
- **connection to inland transportation routes**



Difference between chart analysis and database mining can be very significant

Factors affecting TSV/HSC performance/access are only beginning to be understood – iterative approach to data mining

formation on Infrastructure

Much information is not available without a site visit

However, classes of ports have similar needs for infrastructure:

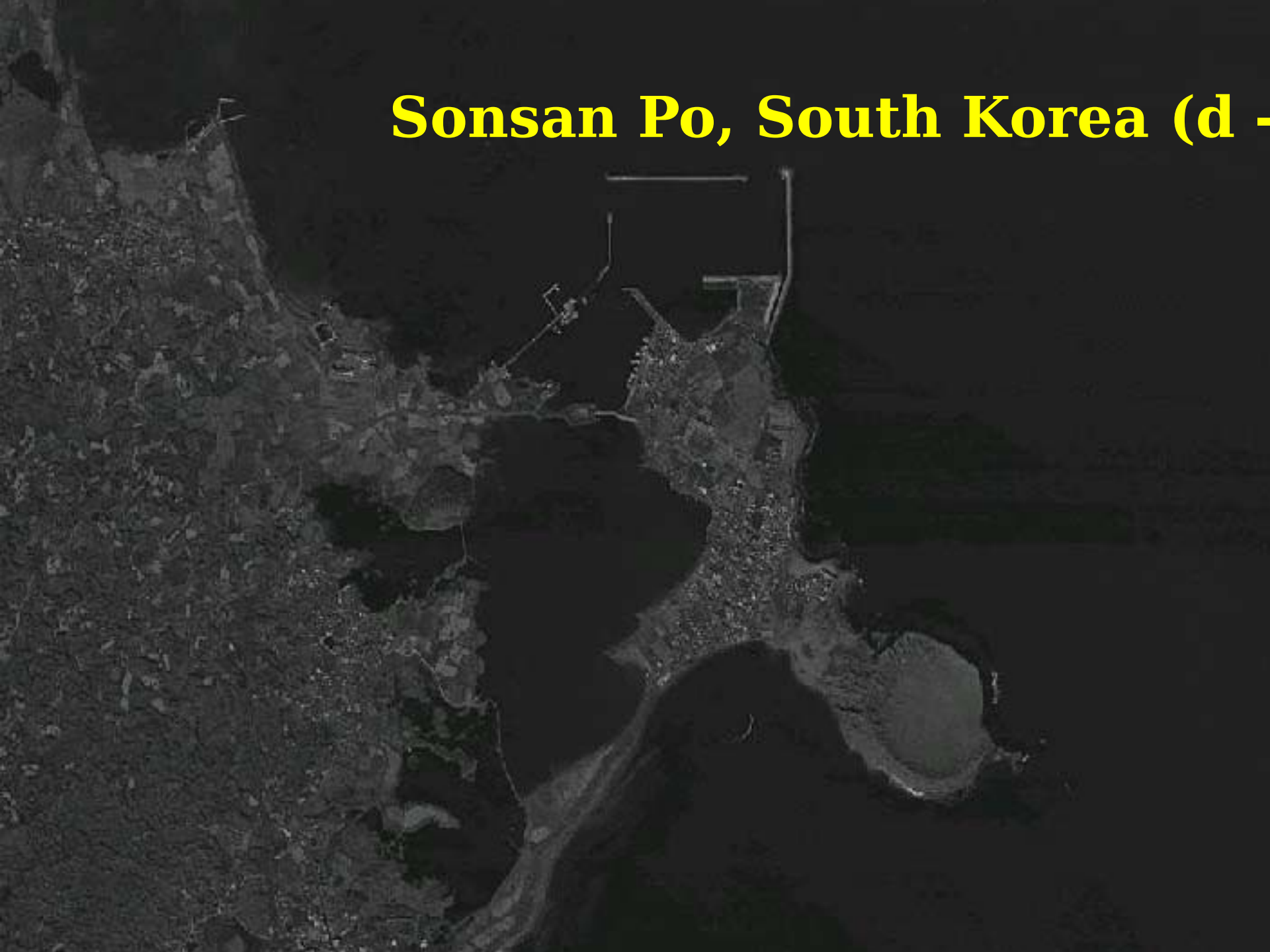
- petroleum offload
- agricultural products
- mining products
- fisheries
- etc.

Need an inferential tool!

Songkhla Harbor, Thailand (d >2

Po Hang hang, SK (d = 15-20ft)

Pontianak, Indonesia (d
=10-15 ft)


Sonsan Po, South Korea (d -

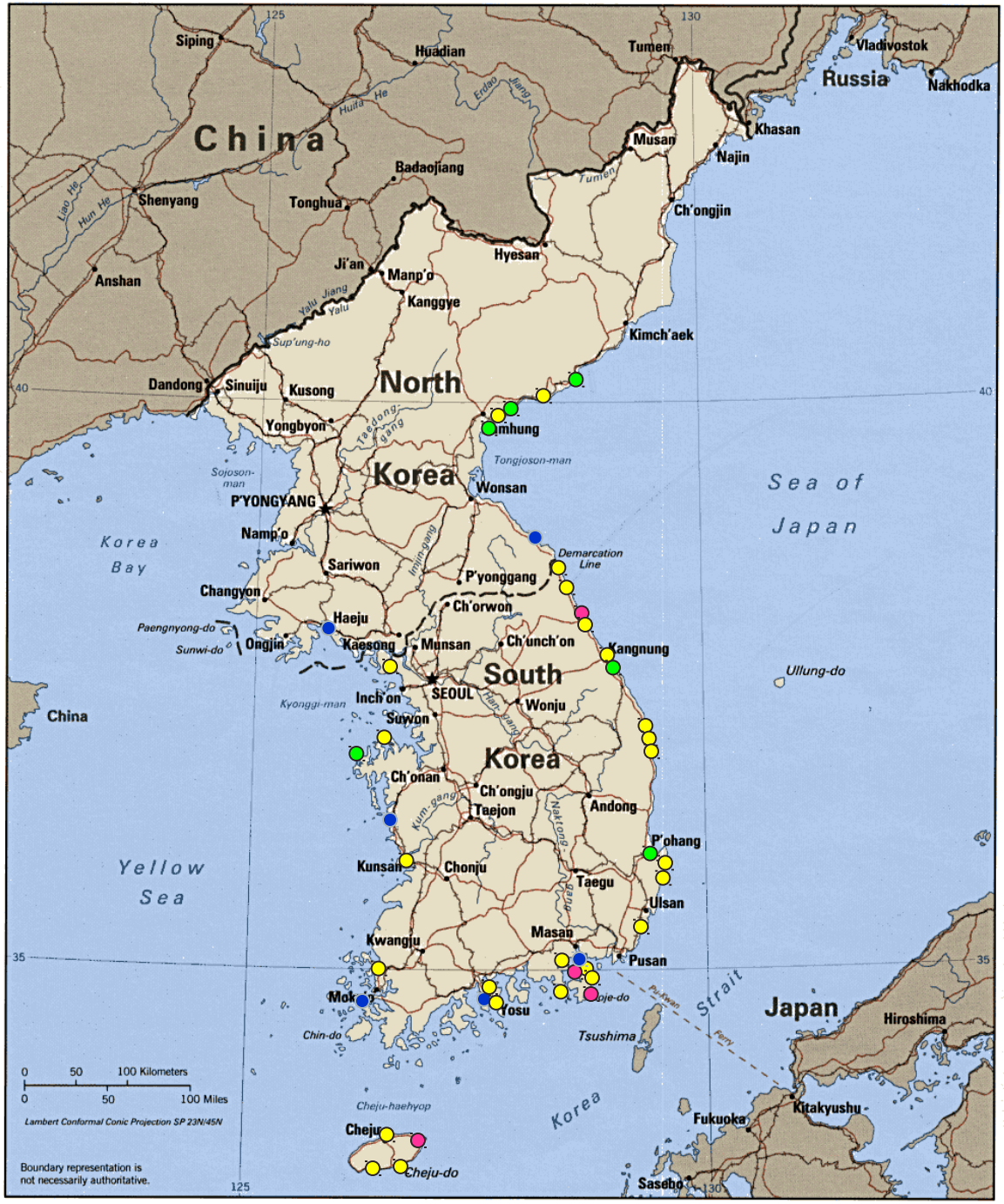
LINK TO INLAND INFRASTRUCTUR

Three different dimensions of site selection:

1. Throughput Rates
   - Type of road network
   - Environmental conditions
   - Road characteristics
   - Topography
   - “Bottlenecks”
   - Urban characteristics/congestion
   - Off-road characteristics
2. Potential Threats
   - Bridges
   - Tunnels
   - Topography
   - Urban structures/damage
3. Maneuver Advantage

Indonesia
International boundary
National capital
Railroad
Road
0 200 400 Kilometers
0 200 400 Miles
Mercator Projection
THAILAND
BURMA
LAOS
VIETNAM
CAMBODIA
PHILIPPINES
Manila
Bangkok
Phnom Penh
Ho Chi Minh City
Andaman Sea
Gulf of Thailand
South China Sea
Philippine Sea
Sulu Sea
Celebes Sea
Java Sea
Banda Sea
Arafura Sea
Timor Sea
Molucca Sea
Halmahera Sea
SPRATLY ISLANDS
NICOBAR ISLANDS (INDIA)
Phuket
George Town
MALAYSIA
Kuala Lumpur
SINGAPORE
Singapore
Medan
Sumatra
Palembang
Bengkulu
Pekanbaru
Padang
Jakarta
Bandar Seri Begawan
BRUNEI
Kota Kinabalu
Kuching
Pontianak
Banjarmasin
Balikpapan
Samarinda
Tarakan
Kalimantan
Borneo
Sandakan
Zamboanga
Davao
Mindanao
Negros
Cebu
Palawan
Koror
PALAU
PACIFIC OCEAN
Manado
Ternate
Kotamobagu
Makassar
Kendari
Bau-Bau
Ambon
Sorong
Biak
Jayapura
Nabire
Merauke
New Guinea
PAPUA NEW GUINEA
KEPULAUAN ARU
KEPULAUAN TANIMBAR
KEPULAUAN SULA
GREATER SUNDA ISLANDS
LESSER SUNDA ISLANDS
Bandung
Semarang
Surabaya
Yogyakarta
Cirebon
Madura
Bali
Denpasar
Lombok
Sumbawa
Flores
Sumba
Kupang
Dili
EAST TIMOR
Tutuala
Timor
Darwin
AUSTRALIA
Gulf of Carpentaria
Ashmore and Cartier Islands (AUSTRALIA)
Christmas Island (AUSTRALIA)
Cocos (Keeling) Islands (AUSTRALIA)
INDIAN OCEAN
Equator
100
110
120
130
140

Korean Peninsula



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In some areas of the world t
road infrastructure is replac
major river systems

Such rivers offer potential k
Inroads for logistics operati
River-Road junctions

ternative Offload Sites:

Rivers

In some areas of the world t
coast is protected by natura
barriers –barrier islands, lar
masses, reefs, etc.

In such areas TSV/HSC
operations might be possibl
the “open” coast

ternative Offload Site

Coasts

tuaries, Open-coast sheltered area

QUESTIONS??